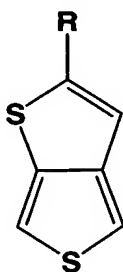


## CLAIMS

We claim:

1. A film comprising conducting polymer applied from a dispersion containing particles having a particle size of less than 450 nm, wherein the conducting polymer comprises substituted or unsubstituted, uncharged or charged polymerized units of thieno[3,4-b]thiophene, and wherein a film drop cast from the dispersion has a conductivity from  $10^{-1}$  to  $10^{-6}$  S/cm measured using the four point probe method.
2. The film of claim 1 wherein said particle size is less than 200 nm.
3. The film of claim 1 wherein said film has a conductivity of from  $10^{-2}$  to  $10^{-6}$  S/cm.
4. The film of claim 1 wherein said film has a conductivity of from  $10^{-2}$  to  $10^{-5}$  S/cm.
5. The film of claim 2 wherein said film has a conductivity of from  $10^{-2}$  to  $10^{-6}$  S/cm.
6. The film of claim 2 wherein said film has a conductivity of from  $10^{-2}$  to  $10^{-5}$  S/cm.
7. The film of claim 1 wherein the conducting polymer comprises substituted or unsubstituted, uncharged or charged polymerized units of



(I)

- where R is hydrogen, substituted or unsubstituted ( $C_1$ - $C_{18}$ )-alkyl, preferably ( $C_1$ - $C_{10}$ )-alkyl, in particular ( $C_1$ - $C_6$ )-alkyl, for example, *t*-butyl, ( $C_3$ - $C_7$ )-cycloalkyl, ( $C_1$ - $C_{18}$ )-alkyloxy, preferably ( $C_1$ - $C_{10}$ )-alkyloxy, or ( $C_2$ - $C_{18}$ )-alkyloxy ester, phenyl and substituted phenyl,  $SF_5$ .

8. A dispersion comprising conducting polymer containing particles having a particle size of less than 450 nm, wherein the conducting polymer comprises substituted or

unsubstituted, uncharged or charged polymerized units of thieno[3,4-b]thiophene, and wherein a film drop cast from the dispersion has a conductivity from  $10^{-1}$  to  $10^{-6}$  S/cm measured using the four point probe method.

5 9. The dispersion of claim 8 wherein said particle size is less than 200 nm.

10. The dispersion of claim 8 wherein said film has a conductivity of from  $10^{-2}$  to  $10^{-6}$  S/cm.

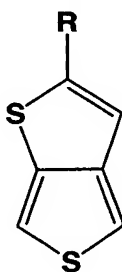
10 11. The dispersion of claim 8 wherein said film has a conductivity of from  $10^{-2}$  to  $10^{-5}$  S/cm.

12. The dispersion of claim 9 wherein said film has a conductivity of from  $10^{-2}$  to  $10^{-6}$  S/cm.

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13. The dispersion of claim 9 wherein said film has a conductivity of from  $10^{-2}$  to  $10^{-5}$  S/cm.

14. The dispersion of claim 8 wherein the conducting polymer comprises substituted or  
20 unsubstituted, uncharged or charged polymerized units of



(I)

where R is hydrogen, substituted or unsubstituted ( $C_1$ - $C_{18}$ )-alkyl, preferably ( $C_1$ - $C_{10}$ )-alkyl, in particular ( $C_1$ - $C_6$ )-alkyl, for example, *t*-butyl, ( $C_3$ - $C_7$ )-cycloalkyl, ( $C_1$ - $C_{18}$ )-alkyloxy, preferably ( $C_1$ - $C_{10}$ )-alkyloxy, or ( $C_2$ - $C_{18}$ )-alkyloxy ester, phenyl and substituted phenyl,  
25  $SF_5$ .

15. An optoelectronic device comprising a film comprising conducting polymer applied from a dispersion containing particles having a particle size of less than 450 nm, wherein

the conducting polymer comprises substituted or unsubstituted, uncharged or charged polymerized units of thieno[3,4-b]thiophene, and wherein a film drop cast from the dispersion has a conductivity from  $10^{-1}$  to  $10^{-6}$  S/cm measured using the four point probe method.

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16. The optoelectronic device of claim 15 wherein said device is selected from the group consisting of a light emitting diode, a photovoltaic device, and a laser diode.

17. The optoelectronic device of claim 15 wherein said film is a hole injection layer.

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18. The optoelectronic device of claim 15 wherein said film is a hole transport layer.

19. The optoelectronic device of claim 15 wherein said film is a hole injection and hole transport layer.

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20. The optoelectronic device of claim 15 wherein said film has a conductivity of from  $10^{-2}$  to  $10^{-6}$  S/cm.

21. The optoelectronic device of claim 15 wherein said film has a conductivity of from

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$10^{-2}$  to  $10^{-5}$  S/cm.